

**SYSTEM, APPARATUS, AND METHOD FOR REDISTRIBUTING FORCES TO
MEET PERFORMANCE GOALS AND SHOCK WAVE DISTURBANCE
CONSTRAINTS**

John M. Morgenstern
Alan E. Arslan
James Bach

ABSTRACT

A system and method for configuring an aircraft for low sonic boom supersonic flight conditions includes redistributing lift of a wing by configuring the wing with one or more areas of far-field expansion ahead of areas of far-field compression. An equivalent area distribution goal curve is scaled to account for the equivalent area reduction due to excursions below to goal curve. A relaxed constraint allows the equivalent area distribution of the aircraft to be at or below the equivalent area distribution goal curve to enable multiple parameters to be configured to meet the equivalent area distribution constraint, as well as other constraints. The system and method can be adapted to aid in the design of any type of vehicle whose surfaces are subject to supersonic fluid flow, especially to reduce sonic boom.